

Notice of Allowability

Application No.

09/739,477

Examiner

Wesley D Markham

Applicant(s)

ZHANG, YUEGANG

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the after final amendment filed on 1/25/2005.
2. ☒ The allowed claim(s) is/are 1,4-7,9-17,19-25 and 27-34.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date attached.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date attached.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

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EXAMINER'S AMENDMENT / ALLOWANCE

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Norman Soloway, attorney for the applicant, on 2/7/2005.

The application has been amended as follows:

In the claims:

In Claim 6, line 1, the phrase, "claim 3" has been amended to read, --claim 1--.

In the drawings:

The following changes to the drawings have been approved by the examiner and agreed upon by the applicant: In Figure 2, the "10 nm" length scale in the bottom right corner of the micrograph must be deleted. In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

Allowable Subject Matter

First, the examiner notes that the after-final amendment filed by the applicant on 1/25/2005, in which (1) a substitute specification was submitted, (2) Claims 1, 4, 7, 14,

Art Unit: 1762

19, 21, 25, and 32 were amended, and (3) Claims 3, 8, and 26 were canceled has been entered. As such, the objection to the title of the invention, set forth in paragraph 5 of the previous Office action, is withdrawn.

Claims 1, 4 – 7, 9 – 17, 19 – 25, and 27 – 34 are allowed. The following is an examiner's statement of reasons for allowance: The present invention, as embodied by independent Claims 1, 7, 14, 19, 21, 25, and 32, is drawn to a method of processing (or forming the top of) a nanotube. The method comprises contacting a nanotube with a reactive substrate having a defined edge, causing a solid state reaction between a selected part / region of the nanotube and the reactive substrate to produce, in the selected part, a reaction product having a boundary aligned with the defined edge of the substrate, and separating the nanotube from the reaction product at the boundary to define an end (or top) of the nanotube. The closest prior art of record is Jin et al. (USPN 6,283,812 B1). Jin et al. teaches a method of processing a nanotube, specifically a method of forming a tip (i.e., a top) of a (carbon) nanotube (Abstract, Col.3, lines 5 – 49), the method comprising contacting a selected part of a nanotube (i.e., the ends of the nanotubes desired to be truncated) with a "solid state reactive substrate" (i.e., a solid metal or alloy having a high solid solubility of carbon) having a "defined edge" (i.e., the top of hot solid metal "40") (Figure 3B; Col.6, lines 39 – 43 and 66 – 67; Col.7, lines 1 – 8), heating the solid state reactive substrate (Col.7, lines 1 – 4) to cause a "selective solid state reaction", specifically the dissolution of a desired length of the carbon nanotube ends by solid state diffusion (Col.7, lines 4 – 8), in a contacting region of the selected part of the nanotube (i.e., the nanotube ends) and the solid state reactive

Art Unit: 1762

substrate to have the selected part become a reaction product (i.e., by dissolving only the desired length of the ends of the nanotube) (Col.7, lines 4 – 12), wherein a boundary between the reaction product and the nanotube is self-aligned to the defined edge (i.e., the top of hot solid metal “40”) of the solid state reactive substrate (Figure 3B, Col.7, lines 4 – 12). However, the prior art of record (including Jin et al.), alone or in combination, does not teach or reasonably suggest the following limitations in conjunction with the applicant’s claimed method of using a solid state reaction to define an end / top of a nanotube: (1) contacting the nanotubes with the substrate by dispersing the nanotubes in an organic solvent, applying the dispersion to the substrate, and evaporating the solvent (Claims 7 and 25); (2) separating the nanotube from the reaction product by rapidly cooling the reaction product (Claims 1 and 21); (3) using Nb as the reactive substrate (Claims 14 and 32); and (4) using a hole formed in the substrate as the “defined edge” (Claim 19). For these reasons, independent Claims 1, 7, 14, 19, 21, 25, and 32 are allowed. Since the rest of the pending claims depend from either Claim 1 or Claim 21, these claims are also allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Art Unit: 1762

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Wesley D. Markham
Examiner
Art Unit 1762



TIMOTHY MEEKS
PRIMARY EXAMINER